Temporary Operating Suspensions

Given the unpredictable nature of weather, coupled with variable river, ice/snow conditions, particularly during the winter months, Redfern has identified certain circumstances that would likely result in the temporary suspension or delay of operations. During the first couple of years of operations, detailed log books will be maintained to record weather and river conditions and operating procedures performed on a daily (or weekly) basis. This information will be used to refine operational procedures, scheduling, etc. where changes to these procedures are indicated through experience gained on the river. The proposed operating plan incorporates 20% downtime to accommodate weather delays, suspension during freeze-up and break-up, and routine maintenance. The table below presents some of the potential conditions that would likely cause operations to be temporarily suspended; it should be recognized, however, that the operating ranges indicated and the associated operating guidelines will vary as further experience is gained during the initial years of operations, and due to unusual weather events that cannot be predicted.

Operating Constraints for ACB Operations on the Taku River

Condition	Range	Operating Guideline
Snow accumulation over 48 hours	> 16 inches 8 to 16 inches < 8 inches	• The route will be groomed ahead of the ACB using the amphitrac (multiple passes will be required, depending on depth of fresh snow) • May require two amphitracs to push and pull the ACB along the lightly compacted route. • No specific procedures needed.
Temperature	< - 22° F (-30° C)	• Delay operations until temperatures predicted to remain above -22° F for at least 24 hours. * * *Concern relates to crew safety; equipment is designed to operate at temperatures at or below -22°F;*
Sustained Wind Speed *High wind speeds that could cause temporary delay in operations are more of a concern in Taku Inlet, Gastineau Channel area and are less of a concern on the river itself.*	>46 mph *(>Beaufort Scale 8; fresh gale or stronger)* 25 to 46 mph *(Beaufort Scale 6-8; strong breeze to fresh gale)* <25 mph *(Beaufort Scale 6; calm to fresh breeze)*	• Delay operations until wind speed remains below 46 mph for 24 hours; • If wind speed is building, or strong winds continue to be forecast, delay departure until suitable conditions are forecast for 24-hour period. • If wind speed were subsiding, and forecast to continue to drop, operations would proceed on schedule. • If wind speeds were less than 25 mph, operations would proceed as scheduled.

Condition	Range	Operating Guideline
Thickness of Floating Ice and Extent of Ice Cover[1]	≤ 3 inches thick shelf ice	• Maintain aquatic operations in open mainstem channel (avoid thin ice shelves forming along sides of river channel, or near gravel bars)
	≥3 inches thick shelf ice	• Select route that traverses solid shelf ice, avoiding open leads in mainstem as much as possible to minimize ice breaking and maintain efficient operations
	≥ 80% continuous ice cover on river	• No operational constraints if shelf ice cover is continuous, as ACB route would remain on top of ice avoiding need to transition from open water onto floating ice.
Jumble Ice Accumulation	Not expected to pose operational constraint on most of river (areas of accumulation can largely be avoided)	• Use flail/roller bar on amphitrac to groom route and flatten jumble ice, if needed
Visibility *Vessels will be equipped with navigational aids similar to marine vessels, including floodlights, strobe lights, search lights etc.*	<50 feet	• Delay departure until visibility improves to ensure operator visibility between tow vessel and ACB (approx. 50ft).
	50 to 100 feet	• Follow GPS route; reduce speed as determined by barge master
	>100 feet	• No constraints identified
Current Velocity *Fastest current is in the narrows at Canyon Island, during freshet, where maximum velocity can reach 9 to 10 knots.*	9 to 10 knots	• Narrows at Canyon Island will not be traversed by ACB during aquatic season. Route will use east channel at Canyon Island where current is slower. • Barge master to assess whether additional power is required (e.g. second tug or amphitrac) to maintain control at all times.
	<9 knots	• SDT has 2000 HP engine and is more than adequate to manoeuvre ACB upstream and downstream at this velocity.

[1] For purposes of this document, shelf ice means all floating ice extending from the shoreline, and including land fast ice extending up to the mainstem (thalweg) river channel. Due to the braided nature of the river and lower water levels during the late fall and winter, formation of ice is quite extensive and tends to form first over gravel bars and shallow channels, whereas the thalweg remains ice free for a longer period, and tends to freeze last (where river current is highest). Travel on ice-covered land or gravel/sand bars is preferred, avoiding potential for ice breaking that can occur if transitioning from open water onto floating ice.